# Generative adversarial networks and synthetic patient data: current challenges and future perspectives

## Abstract

ABSTRACT Artificial intelligence (AI) has been heralded as one of the key technological innovations of the 21st century. Within healthcare, much attention has been placed upon the ability of deductive AI systems to analyse large datasets to find patterns that would be unfeasible to program. Generative AI, including generative adversarial networks, are a newer type of machine learning that functions to create fake data after learning the properties of real data. Artificially generated patient data has the potential to revolutionise clinical research and protect patient privacy. Using novel techniques, it is increasingly possible to fully anonymise datasets to the point where no datapoint is traceable to any real individual. This can be used to expand and balance datasets as well as to replace the use of real patient data in certain contexts. This paper focuses upon three key uses of synthetic data: clinical research, data privacy and medical education. We also highlight ethical and practical concerns that require consideration.